

عنوان مقاله:

A Computational Approach to a Mathematical Model of Climate Change Using Heat Sources and Diffusion

محل انتشار:

ژورنال مهندسی عمران، دوره 8، شماره 7 (سال: 1401)

تعداد صفحات اصل مقاله: 11

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خلاصه مقاله:

The present work aims to extend the climate change energy balance models using a heat source. An ordinary differential equations (ODEs) model is extended to a partial differential equations (PDEs) model using the effects of diffusion over the spatial variable. In addition, numerical schemes are presented using the Taylor series expansions. For the climate change model in the form of ODEs, a comparison of the presented scheme is made with the existing Trapezoidal method. It is found that the presented scheme converges faster than the existing scheme. Also, the proposed scheme provides fewer errors than the existing scheme. The PDEs model is also solved with the presented scheme, and the results are displayed in the form of different graphs. The impact of the climate feedback parameter, the heat uptake parameter of the deep ocean, and the heat source parameter on global mean surface temperature and deep ocean temperature is also portrayed. In addition, these recently developed techniques exhibit a high level of predictability. Doi:

۱۰.۲۸۹۹/CEJ-۲۰۲۲-۰۸-۰۷-۰۴ Full Text: PDF

کلمات کلیدی:

.Energy Balance Models; Heat Sources; Diffusion Effects; Numerical Scheme; Stability

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